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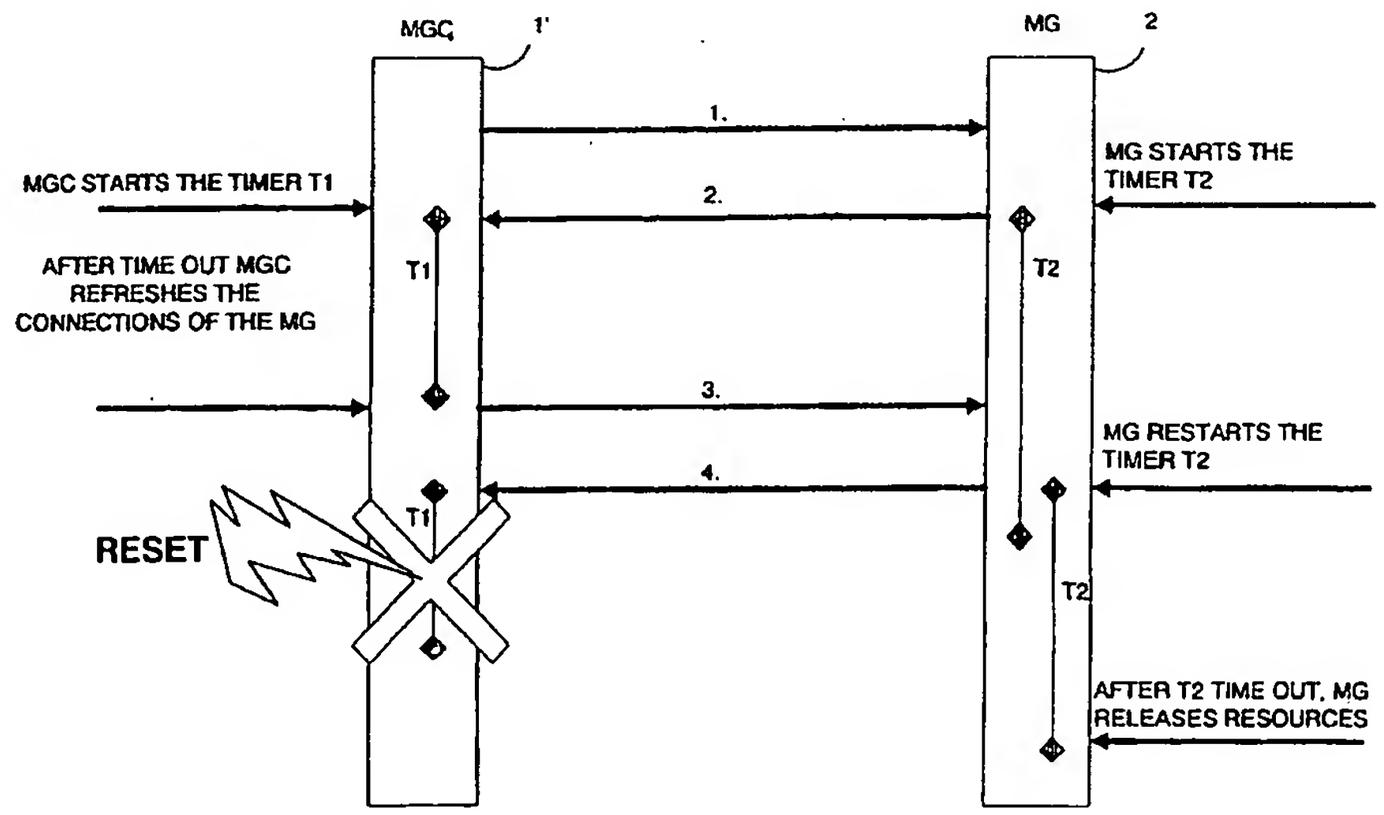
(54) Title: COMMUNICATION SYSTEM COMPRISING A GATEWAY DEVICE FOR HANDLING CONNECTIONS



(57) Abstract: The invention proposes a system and method for handling a connection in a communication system comprising a gateway device having a gateway and a gateway controller controlling the gateway. The gateway and/or the gateway controller start a timer when sending signals/information to, or receiving signals/information from, the gateway controller or the gateway, respectively, and initiate a process for changing the present status when not receiving an expected signal/message from the other component within a defined time interval. For instance, the gateway will release reserved resources when not receiving, within the defined time interval, a renewed request for reserving resources. Additionally, or alternatively, the gateway controller will release a connection when the gateway does not confirm the reservation within the defined time interval.

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COMMUNICATION SYSTEM COMPRISING A GATEWAY DEVICE FOR HANDLING CONNECTIONS

FIELD OF THE INVENTION

The invention relates to a communication system comprising a gateway device, and to a method for handling a connection in such a communication system.

BACKGROUND OF THE INVENTION

The Technical Specification TS 101 313 V0.4.2 (1999-02) of ETSI (European Telecommunications Standards Institute) describes a network architecture and configurations for TIPHON (telecommunications and internet protocol harmonisation over networks), and illustrates a basic call reference configuration (Fig. 1) comprising a decomposed gateway having a media gateway controller and a media gateway controlled by the controller. The media gateway controller provides the call processing (call handling) functions for the gateway. The media gateway is a device operating on media streams.

The decomposing of the gateway into the gateway function and the gateway control is of advantage as it allows an easy change of the control strategy and parameters without necessity of changing the physical gateway structure. Generally, a gateway is an end point on a network which provides real-time, two-way communication between terminals of two networks, for instance a packet-based network and a circuit-switched network.

A decomposed gateway comprising a media gateway controller and a media gateway is also described in the Technical Specification TS 101 316 V1.1.1 (1999-04) of ETSI. As mentioned in the specification, the information flow between the media gateway and the media gateway controller supports several

functions such as creation, modification and deletion of media stream connections across the media gateway; the specification of transformations to be applied to media streams passing through the media gateway; the request of insertion of tones and announcements into media streams; and/or the request of reports and specific actions to be taken upon detection of specified events within the media streams.

Examples of media gateways may include trunk gateways that interface between SCN (Switched Circuit Networks) networks and packet-based networks such as IP (Internet Protocol) networks; "Voice over ATM (Asynchronous Transfer Mode)" gateways which provide interface to an ATM network; access gateways that provide interfaces between "user to network" interfaces and "Voice over IP" networks; residential gateways, i.e. access gateways for a small number of voice terminals that can be co-located with a cable modem or set top box; network access servers; multipoint processing units; IP gateways; fax gateways that may be used to relay Fax Group 3 calls between an IP network and an SCN, and the like. Calls handled by the decomposed gateway may comprise pure data transmission, voice transmission, for instance over a packet-based network, i.e. a network using packet transmission instead of switched circuit network configuration; audio data; video data, combined audio and video data, and the like. The definitions and examples mentioned in the above referenced documents are herewith included into the disclosure contents of the present application.

Generally, the gateway will be physically connected to one or more packet-switched networks and to one or more circuit switched networks, and is composed of a gateway, a gateway controller and a signalling gateway. One or more of these different functions can be co-located and may also be combined with gatekeepers or with other gateways. The signalling gateway provides the signalling mediation function between the packet-

based domain such as the IP domain, and the circuit switched network (SCN) domain. The media gateway provides the media mapping and/or transcoding functions, and maps (e.g. tandem free operation) or transcodes the media in the packet-switched domain (e.g. media transported over RTP/UDP/IP or the like) and media in the SCN domain (e.g. PCM encoded voice, GSM (Global System for Mobile Telecommunications), etc.). The (media) gateway controller controls the (media) gateways and receives SCN signalling information from the signalling gateway and IP signalling from the gatekeeper.

When, for instance, the gateway controller receives information, from the signalling gateway, on a connection to be performed between two networks or two different connecting points of one network, the gateway controller controls the gateway to reserve resources for handling, i.e. physically providing, the connection. The media gateway thus provides the resources available for calls. The resource monitoring of the gateway controller or of a remote resource monitors conditions such as media gateway trunk utilisation and availability, packet-based networks bandwidths and utilisation etc. useful for making call routing decisions. The gateway resource management allocates internal resources within the media gateway. The resource is necessary for carrying traffic, i.e. transporting the media stream, and normally also for signalling. In a decomposed gateway structure, the signalling aspect will normally be handled by the gateway controller, so that the media gateway does not need to reserve resources for the signalling. The resources may therefore provide the establishment of physical channels.

When problems should occur in the gateway controller or in the gateway after reserving resources in the gateway, for instance for handling connections, there is a problem that resources may continuously be reserved although they are no longer needed. Generally, if the resource management and the physical

resources are located in different network elements as stated above, it is very difficult to synchronise or manage a situation when the gateway controller or the gateway experiences problems, for instance crashes. Complicated recovery procedures will be necessary for recovering after such a crash.

SUMMARY OF THE INVENTION

The present invention provides a system and method for handling connections in a gateway structure having a separated gateway and gateway controller wherein recovery after occurence of problems in the gateway or gateway controller is simplified.

According to one aspect of the invention, a time-supervised resource reservation is provided which simplifies the implementation and prevents any unduly long blocking of resources. When the gateway controller requests the gateway to reserve resources, this reservation is valid only during a defined time interval. If the gateway controller does not regenerate or request again the reservation during the defined time interval, the gateway releases the resource.

According to a further aspect of the invention, when the gateway controller tries to request or renew a reservation of resources of the gateway, and the gateway does not confirm this request or reservation within a defined time interval (this defined time interval may be equal to or different from the defined time interval mentioned above), the gateway controller releases the connection(s) so as to prevent the maintaining of a connection in case the gateway is unable to reserve a resource therefor.

The invention thus provides an effective means for handling resource problems in a situation where resource management and

physical resources are located in different network elements. No complicated recovery procedure is necessary for recovering after a crash.

The invention therefore provides connections with time supervision in the gateway.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 shows a basic example of a network comprising a gateway consisting of a gateway controller and several gateways;

Fig. 2 illustrates a block diagram of a decomposed gateway;

Fig. 3 shows a further basic block diagram of a gateway and associated elements;

Fig. 4 illustrates the signal flow between the gateway controller and the gateway;

Fig. 5 shows the signal flow in another embodiment of the invention; and

Fig. 6 illustrates a simplified diagram showing the communication between a media gateway and a media gateway controller.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Fig. 1 shows a basic example of one embodiment of the invention. The system comprises a common channel signalling unit (CCSU) 1 which incorporates a media gateway controller (MGC) and is connected to media gateways (S30) 2, 3 via paths (lines) 4, 5. Furthermore, the unit 1 is connected, via paths

(lines) 6, 7, to local exchanges (LE) 8, 9 handling calls from/to user equipments 10 which may be analogue or digital telephone sets, multimedia computers, other types of media streams generating units, fax machines or the like. The local exchanges (LE) 8, 9 are interconnected with the media gateways 2, 3 by means of paths (E1) 11, 12. The media gateways 2, 3 are furthermore connected via paths (IP) 13, 14 to an access node 15.

The communication between elements 1, 2, 3, and 15 may be performed using an intranet 16 which may be a packet-based network such as IP (Internet Protocol) network. The access node 15 provides access to a further network 17 which may be the internet or any other packet-or circuit-switched network. In the present example, the user equipments 10 are connected to the local exchanges (LE) 8, 9. Packet-switched access, preferably IP access, is provided by the media gateways (S30) 2, 3 which may be located in the same premise as the local exchanges 8, 9. The unit 1 may be located anywhere in a PSTN (Public Switched Telecommunication Network) network. The unit 1 controls and responds to e.g. SS7 (Signalling System 7) circuits or circuits of other signalling type, which are connected to the unit 1 and to the local exchanges 8, 9. The media gateways 2, 3 provides modem pool, RADIUS (remote authentication dial in user service) for authentication, and layer 2 tunnelling using L2TP (Layer 2 Terminal Protocol). The media gateways 2, 3 are arranged to forward incoming calls to the access node 15 through a L2TP tunnel. The access node 15 is a router with access server functionality.

The unit 1 and media gateways 2, 3 providing IP access combine PSTN and IP-based network elements in a system solution that enables an IP access provided to collect IP access traffic directly from small dial-up (local) sites to the IP access network. The system statistically multiplexes internet traffic from PSTN channels using an appropriate network such as a

ATM/IP network or Ethernet/IP (100 MBit) network. The media gateways 2, 3 are preferably located close to the PSTN customer sites (local equipments 10) for reducing capacity needed in transit. The local exchanges 8, 9 preferably connect IP dial-up traffic directly to the media gateways 2, 3 by using the E1 paths. The local exchange (LE) signalling related to IP dial-up calls is preferably connected, by using SS7 (ISUP, i.e. ISDN user part) interface to the unit 1 that controls the media gateways 2, 3 dial-up access devices by using an appropriate protocol such as H.248 (Megaco) protocol. The media gateways 2, 3 offer pools for dial-up access and provide communication to an IP access router such as access node 15 using tunnels to the access router with L2TP protocol.

In the decomposed gateway model shown in Fig. 1, the media gateway controller (MGC) contained in, or represented by, unit 1 controls the resources of the media gateways (MG) 2, 3 via a media gateway control protocol such as Megaco/H.248 or MGCP (Media Gateway Control Protocol) or the like. Generally, the media gateways 2, 3 convert media (information normally but not forcibly of multimedia type consisting of, or comprising audio information, video information, data and/or other type of information) provided in one type of network to a format required in another type of network. For example, the media gateways 2, 3 terminate bearer channels from a switched circuit network (from local exchange 8, 9) and media streams from a packet-based network. The media gateway controller controls the parts of the call state that pertain to connection control for media channels in the media gateways 2, 3.

Fig. 2 shows part of the embodiment of Fig. 1 in greater detail. The CCSU unit 1 consists of a media gateway controller (MGC) 1' and a signalling gateway (SG) 1'', the latter being connected to line 7 (ISUP) and receiving the call initiating and terminating signals and the like. The media gateway 2 provides the connection between the SCN network (path 11) and

the IP-based path 13 and may, as shown, consist of several similar parts for handling the signals to be transmitted by the individual lines of the switched circuit network and/or the different IP-based channels. The interface between the media gateway controller 1' and the media gateway 2 is Ethernet-based but may also be based on a different network interconnection model. Fig. 2 shows only some parts of Fig. 1. The media gateway 3 is structured and arranged in a similar manner as gateway 2 shown in Fig. 2, and is controlled by media gateway controller 1'.

When an user makes a call to an IP dial-up number, the local exchange 8 (or 9) analyses the dialling and detects the destination (gateway 2 or 3) to which the call is to be routed. The local exchange 8 (or 9) searches a free circuit for the destination and continues the call set-up by sending an initial address message (IAM) using the SS7-based network (path 6 or 7) to the destination which in this case is the unit 1 of the internet service provider. When the unit 1 receives the IAM message, it analyses the called party number and connects this call to the media gateway 2 (or 3). The unit 1 uses circuit information contained in the IAM message to detect the correct gateway 2 (or 3) and the corresponding PCM (Pulse Code Modulation) and TSL (Time Slot) for this gateway. Furthermore, the unit 1 generates an IP access call identifier for the connection and sends, in this example, two Megaco audit commands inside a context to the gateway 2 (or 3). One audit command is for the circuit termination and one for L2TP termination. In the audit command is the gateway's 2 (or 3) PCM and TSL which are used in this call, the IP access call identifier, the calling and the called party numbers. The gateway performs the necessary tasks to handle the call and connects the circuit and, thereafter, the gateway acknowledges the audit command and starts to wait for the local exchange 8 or 9 to connect the circuit. When the gateway detects that the circuit is connected in the local exchange, it acts as a modem

or ISDN server for PSTN subscribers, and tunnels all traffic with L2TP or other devices. When the connection is established, the gateway operates as a forwarding element for the access server, e.g. access node 15. During the call active state, the unit 1 and the gateway 2 (or 3) supervise the connection state as described below.

Fig. 3 shows a further basic structure of a decomposed gateway 18 which comprises the media gateway controller 1', the signalling gateway 1'' and the media gateway 2. The signalling gateway 1'' is connected to the signalling line E.b whereas the media gateway is connected to the traffic line E.a. In the example shown in Fig. 3, the media gateway 2 is connected to a H.323 terminal 19. Moreover, gatekeepers 20, 21 are provided with elements responsible for the registration, admission, and status (RAS) of terminals and gateways. The gatekeepers participate in zone management, call processing and call signalling. A back-end element 22 is used by the gateways and gatekeepers to provide additional functions such as authentication function, billing and rating/tariffing, address resolution function and the like. The back-end elements may be located within the SCN, within the IP network, or anywhere else in the network. The structure, arrangement and function of the elements shown in Fig. 3 are illustrated and described in ETSI TS 101 313 V0.4.2, the disclosure contents of which is herewith incorporated and will therefore not be again described.

Fig. 4 shows a diagram for illustrating the handling of connections with time supervision in the media gateway (MG). The time supervision between the media gateway controller 1' and the media gateway 2 (or 3) is used to supervise connections and the state of the other component. Preferably, a two-stage supervision is used between the media gateway controller 1' (MGC) and the media gateway 2 (3) because in a packet-based network such as an IP network, there is the possibility of IP packages and thus possibly control messages getting lost.

Fig. 4 shows a simplified diagram illustrating the time sequence of requests and commands. The time axis is arranged in the vertical direction from the top to the bottom of Fig. 4. The arrows 1. to 4. between the gateway controller 1' and the gateway 2 (or 3) indicate requests and responses exchanged between these components. To the left of gateway controller 1', and to the right of gateway 2, command descriptions explaining the meaning of the individual processes are added for easier understanding. As first step, the gateway controller 1' sends a request 1. (e.g. a CTX message) to the media gateway 2 indicating the resource to be reserved for handling a call, as indicated by the top arrow 1. between elements 1' and 2. The gateway 2 processes this request and reserves the requested resource. After the inherent processing time, the gateway 2 sends an acknowledgement message 2. (e.g. CTX) back to the gateway controller 1' specifying the reserved resource, and, at the same time, starts a timer T2 which may be a hardware or software timer located within the gateway 2 or associated to gateway 2. The timer T2 is set to a predefined time interval T2.

The media gateway controller 1' likewise comprises at least one timer T1 which is set to a predefined time interval T1 and which is started when receiving the acknowledgement message 2. (CTX) from the media gateway 2, as shown in Fig. 4. The predefined time interval T1 is selected to be shorter than the time T2, and to be even shorter than the time T2 minus the inherent processing time needed in the media gateway 2 for processing a resource request sent from gateway controller 1' to gateway 2.

The gateway controller 1' is arranged for detecting time-out of timer T1, i.e. expiry of the time interval T1 and to refresh the connections of the media gateway 2 by sending again a resource reservation request (e.g. CTX) as indicated by arrow

3. When receiving this request, the gateway 2 processes this request and sends back an acknowledgement thereof (e.g. CTX) represented by arrow 4. This information flow is similar to the first resource reservation request and response indicated by the upper two arrows 1. and 2. shown in Fig. 4. When sending back the acknowledgement response, the media gateway 2 restarts the timer 2, so that the timer does not expire but actually begins again to count the time from its reset. When receiving this acknowledgement response, the gateway controller 1' again restarts its timer T1. This process is cyclically repeated in a normal situation.

The messages sent from the gateway controller 1' upon expiry of timer T1, and the response messages sent from the gateway 2 when restarting the timer T2 may be of any appropriate type of messages such as AuditValue messages, depending on the implementation.

As shown in Fig. 4, a situation is assumed wherein a reset of the gateway controller 1' occurs during the runtime of timer T1 which reset may be caused by external problems, internal difficulties or the like. This reset forceably leads to a reset of timer T1 to zero. However, there is no command for starting again the timer T1, so that the timer T1 does not start to run and therefore does not initiate the generation of a refreshment request upon its expiry. The timer T2 of the media gateway 2 is therefore not reset. The gateway 2 is arranged so as to release its resources when the timer T2 expires so that, after the predetermined time interval T2, resources of the gateway 2 are automatically released and are then available for future connections to be established.

Fig. 5 shows an embodiment wherein, in addition or as alternative to the structure shown in Fig. 4, the gateway controller 1' is adapted to monitor the proper functioning of media gateway 2 (or 3). The request and response names added to

arrows for explanation purposes correspond to the definitions according to the H.248 system. Instead of the H.248 system, any other appropriate protocol system may also be used with similar effect.

In step S10, the gateway controller 1' sends a request or notify command requesting information on the status of a particular requested connection to the gateway 2. When the gateway 2 does not send back a response within a predefined time limit set in the gateway controller 1', for instance by starting a timer when sending the request or notify command, the gateway controller 1' sends a request to the gateway 2 requesting information on the state of the gateway 2 (steps S11, S12). Again, the gateway controller starts a timer and waits for a response within the predefined time interval. This time interval is set so as to correspond to (or be slightly longer than) the maximum time expiring until receipt of the response in normal condition.

If again no response is received from the gateway 2, the gateway controller 1' begins to release, as shown in step S13, all calls and blocks all PCMs connected to that gateway 2, i.e. releases all resources. For releasing the calls, the gateway controller 1' repeatedly sends, in step S14, a CGB (Circuit Group Blocking) message to the local exchange 8 (or 9), and receives back, in step 15, a CGBA acknowledgement signal from local exchange 8 (or 9). According to step S16, the gateway controller 1' repeats the sending of circuit group blocking messages until all PCMs connected to the media gateway 2 (or 3) are released and blocked.

When, as response to the request of step S10 or S12, the gateway controller 1' receives a response from the gateway 2, only the faulty connection is released in step S13', by sending, in step 17, a release command to the gateway 2.

In detail, the gateway controller regularly requests each connection state of the gateway 2 by sending an appropriate command (such as Megaco audit command). When the gateway 2 sends a response indicating that the connection state is incorrect, the gateway controller 1' requests the gateway 2 to release the faulty connection by sending an appropriate command (such as Megaco subtract command as defined in protocol H.248). The gateway 2 acknowledges the receipt of the release command of step S17 by sending back, in step 18, a response confirming the release. Thereafter, the gateway controller 1' sends, in step S19, a release message to the local exchange 8.

When the gateway 2 does not respond to the request sent in step S10 requesting information on the individual connection state, the gateway controller sends, in step S12, the request indicating the state of all connections, i.e. the state of the gateway 2 itself. When the gateway 2 responds, within the predefined time interval set for receipt of such a response, that its own state is correct but the connection is faulty, the gateway controller releases only the faulty connection as stated above. When the gateway 2 does not respond at all to the request of its state, the gateway controller releases all calls connected to that gateway as indicated by steps S14 to S16.

When all calls connected to the gateway 2 are released, the gateway controller 1' prevents an overload situation in the PSTN network and thus in the local exchange 8 (or 9) by clearing calls one by one PCM at a time until all calls are cleared. The gateway controller blocks the PCMs by sending CGB messages to the local exchange.

Fig. 6 shows a further embodiment for monitoring the proper functioning of a network element, which in this embodiment is the gateway controller 1'. The gateway 2 monitors that it is regularly requested, by gateway controller 1', to check and/or send information regarding its connection state within a

defined time interval. This defined time interval is measured within the gateway 2 by means of a (hardware or software) timer. When time-out occurs, i.e. the gateway 2 does not receive a connection state request from gateway controller 1' within the defined time interval, the gateway 2 performs a step S20 wherein it releases its own connection and sends a notifying message (such as "Megaco Notify") regarding the time-out to the gateway controller 1'.

The supervising methods according to Figs. 4, 5, and 6 can be individually implemented in embodiments of the invention. Preferably, at least two of these monitoring methods are combinedly provided in the embodiments.

Although preferred embodiments have been described above, the invention also covers any amendments, changes or modifications of the above features within the ability of the skilled man, without departing from the scope of protection.

Claims

1. Communication system comprising a gateway device having a gateway and a gateway controller controlling the gateway, the gateway forming an interface between communication networks and/or providing a connection between communication entities, the gateway and/or the gateway controller having a timer means being set to a defined time interval, the timer means being started when sending signal/information to, or receiving signal/information from, the gateway controller or the gateway, respectively, and being reset or restarted when receiving signal/information from the other component within the defined time interval, wherein the gateway or gateway controller, respectively, is arranged to perform, upon expiry of the defined time interval, a process for changing the present state or condition of the gateway or gateway controller, respectively.

2. System according to claim 1, wherein the gateway is adapted to reserve resource(s) for establishing at least one connection upon request from the gateway controller, the gateway releasing the resource(s) when not receiving, within the defined time interval, a renewed request for reserving resource(s).

3. System according to claim 1 or 2, wherein the gateway controller is adapted to request the gateway to reserve resources for establishing a connection, the gateway controller releasing the connection when the gateway does not confirm the reservation within a defined time interval.

4. System according to any of the preceding claims, wherein the gateway controller is adapted to start a timer means set to a defined time interval, upon receipt of a confirmation of a request, sent to the gateway, for reserving resources, and to send, to the gateway, a renewed request for reserving resources, or any other information signalling the maintenance of the resources, upon expiry of the defined time interval.

5. System according to any of the preceding claims, wherein the gateway is adapted to start a timer set to a defined time interval, when sending, to the gateway controller, a confirmation of a request received from the gateway controller, for reserving resources, and to release the resources when it does not receive, from the gateway controller, a renewed request for reserving resources or any other information signalling the maintenance of the resources, before expiry of the defined time interval.

6. System according to claim 5, wherein the gateway is adapted to restart its timer when sending, to the gateway controller, a confirmation of a renewed request received from the gateway controller, for reserving resources.

7. Method for handling a connection in a communication system comprising a gateway device having a gateway and a gateway controller controlling the gateway, the gateway forming an interface between communication networks and/or providing a connection between communication entities, the gateway and/or the gateway controller starting the monitoring of time when sending signals/information to, or receiving signals/information from, the gateway controller or the gateway, respectively, and initiating a process for changing the present state or condition of the gateway or gateway

controller, respectively, when not receiving an expected signal/message from the other component within a defined time interval.

8. Method according to claim 7, wherein the gateway reserves resources for handling/transmitting a communication upon request from the gateway controller, the gateway releasing the resources when not receiving, within the defined time interval, a renewed request for reserving resources.

9. Method according to claim 7 or 8, wherein the gateway controller requests the gateway to reserve resources for establishing a connection, the gateway controller releasing the connection when the gateway does not confirm the reservation within the defined time interval.

10. Method according to any of the claims 7 to 9, wherein the gateway controller starts a time measurement upon receipt of a confirmation of its request, sent to the gateway, for reserving resources, and sends, to the gateway, a renewed request for reserving resources or any other information signalling the maintenance of the resources, upon expiry of a defined time interval.

11. Method according to any of the claims 7 to 10, wherein the gateway starts a time measurement when sending, to the gateway controller, a confirmation of a request received from the gateway controller, for reserving resources, and releases the resources when it does not receive, from the gateway controller, a renewed request for reserving resources or any other information signalling the maintenance of the resources, before expiry of a defined time interval.

12. Method according to claim 11, wherein the gateway restarts the time measurement when sending, to the gateway controller, a confirmation of a renewed request received from the gateway controller, for reserving resources.

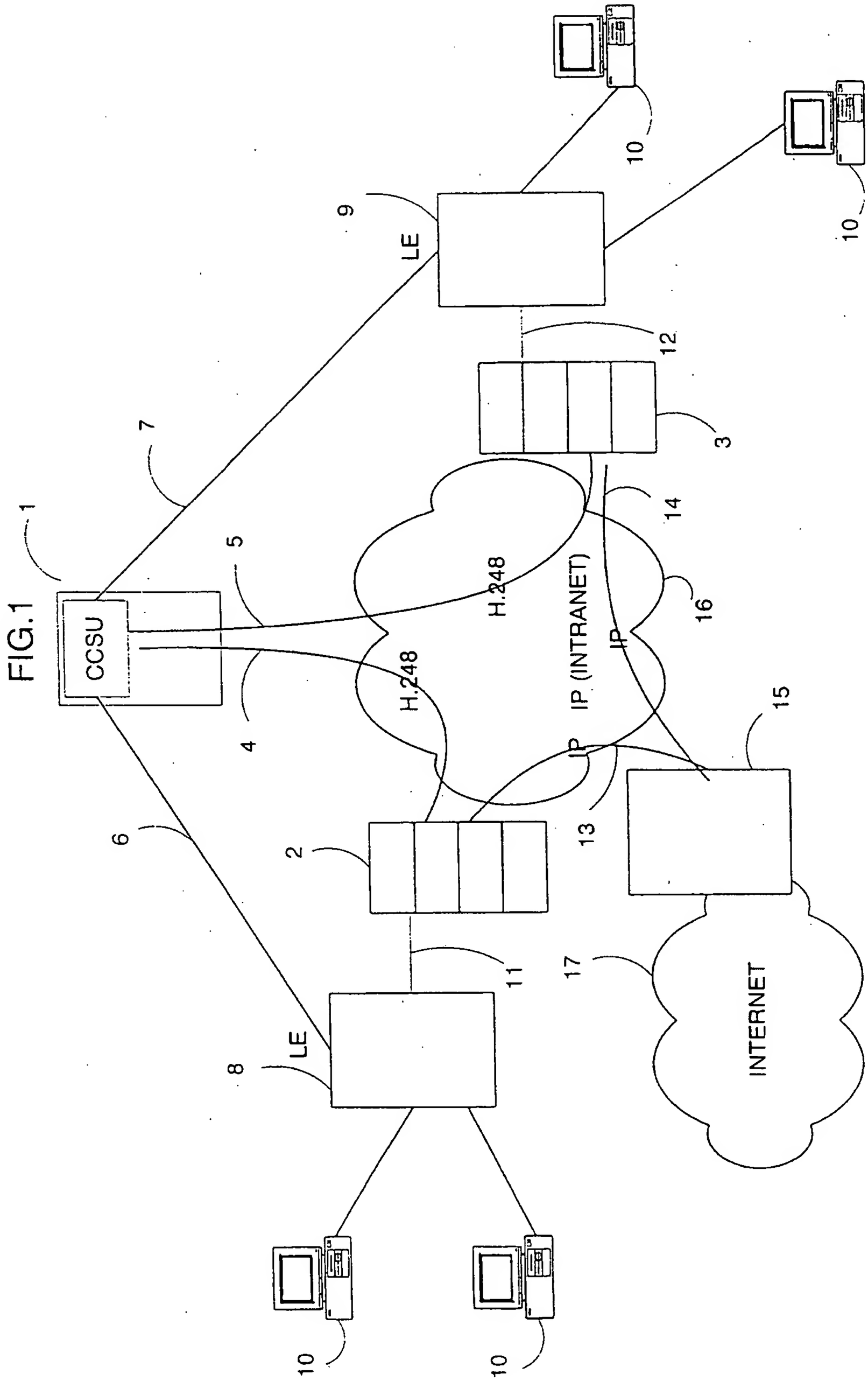
13. Method according to claim 11 or 12, wherein the gateway sends a message to the gateway controller informing the gateway controller on the release of the resources.

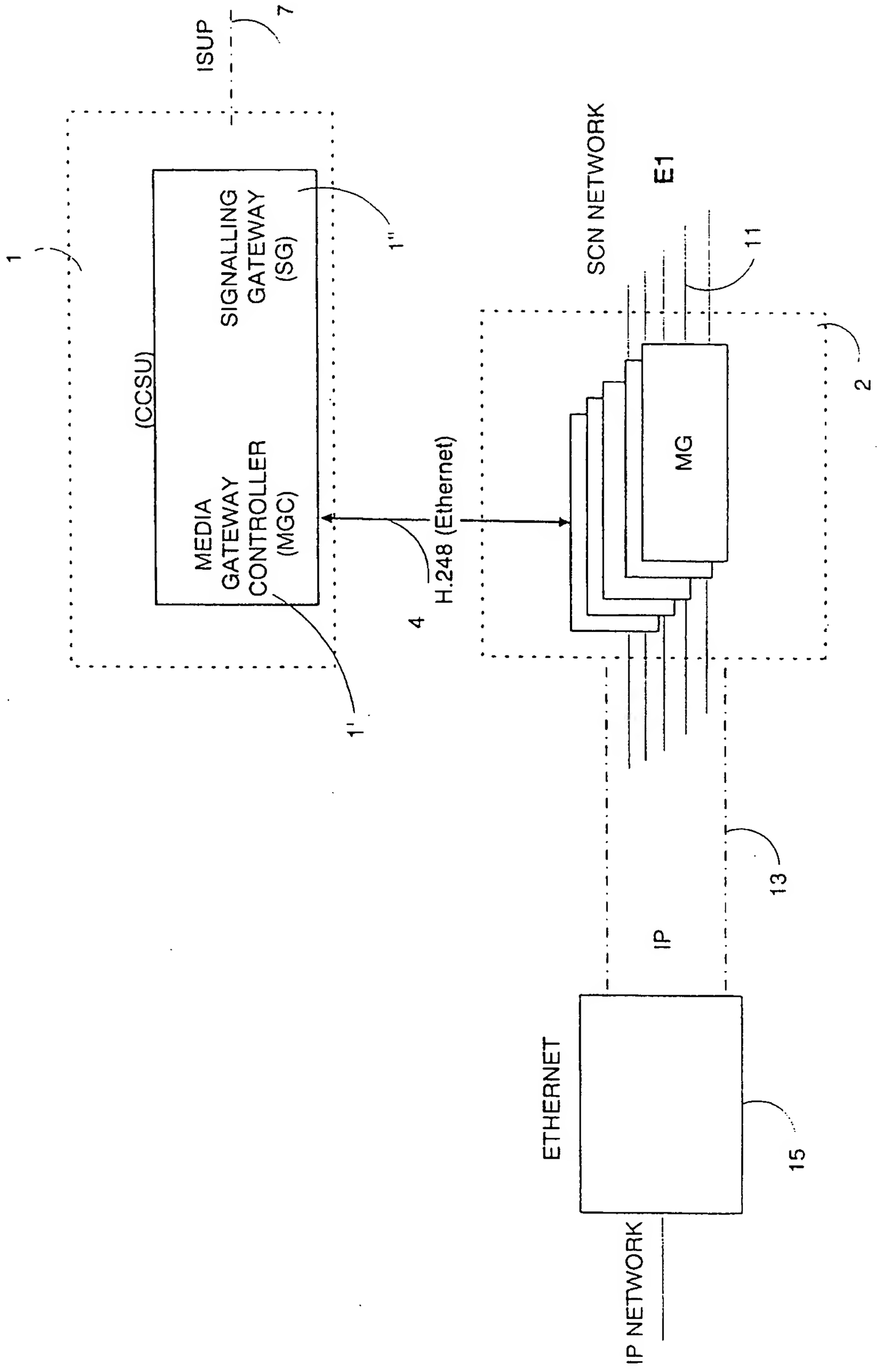
14. Method according to any of the claims 7 to 13, wherein the gateway controller regularly requests the gateway to send connection information on its connection status, and requests, when not receiving the connection information within a defined time interval, gateway status information.

15. Method according to claim 14, wherein the gateway controller releases all connections between the gateway or a local exchange when not receiving the gateway status information within a defined time interval.

16. Method according to claim 14 or 15, wherein the gateway controller releases faulty conection(s) when receiving, from the gateway, information on faulty connection(s) as response to the connection status request.

FIG.1


CCSU
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
LE
LE
H.248
H.248
IP (INTRANET)
IP
IP
INTERNET


ISUP
7
1
SIGNALLING GATEWAY (SG)
1"
(CCSU)
MEDIA GATEWAY CONTROLLER (MGC)
1'
4
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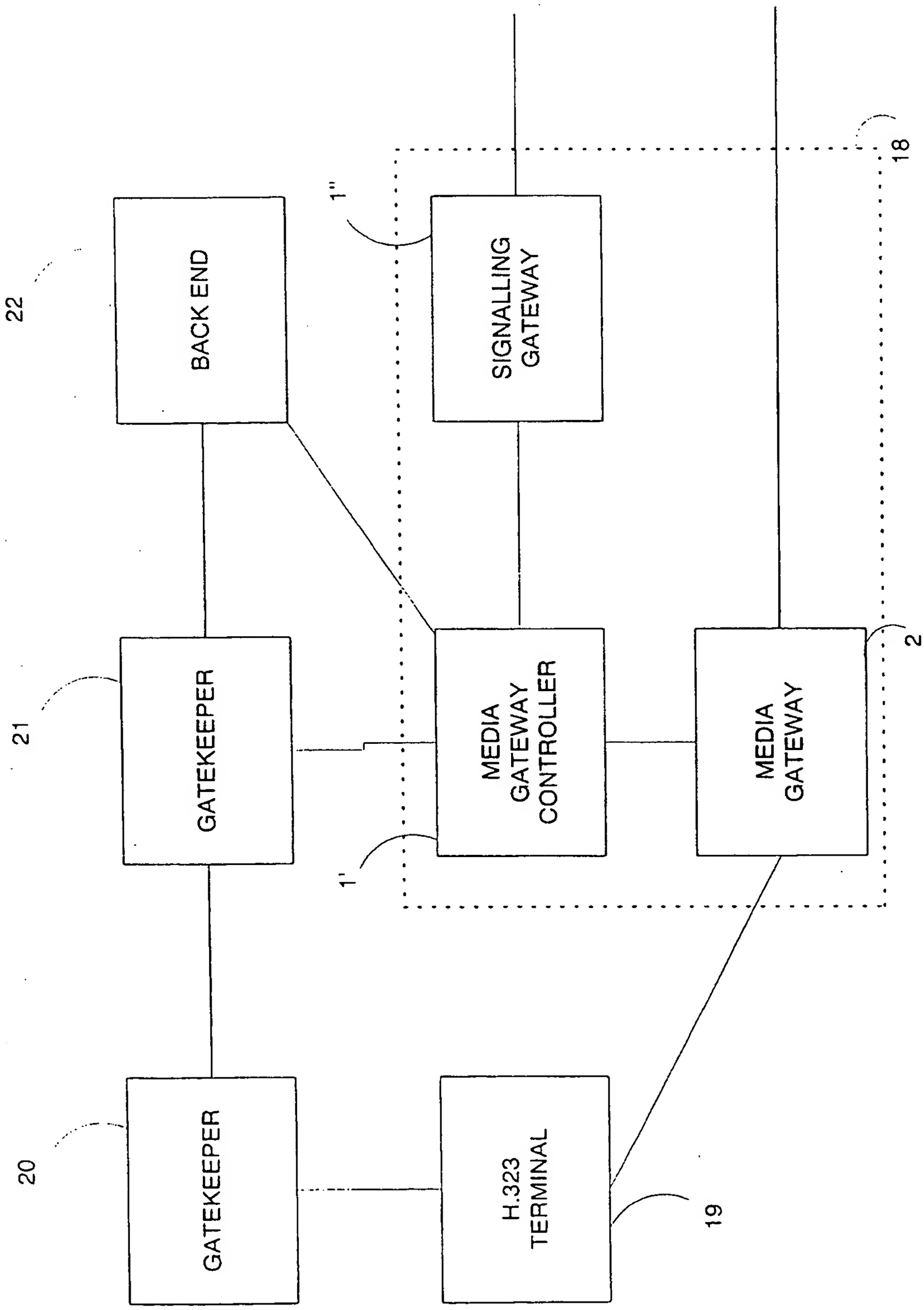
SCN NETWORK
E1
11
2
MG
IP
13
ETHERNET
15
IP NETWORK

FIG.2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SIGNALLING GATEWAY
GATEKEEPER
MEDIA GATEWAY CONTROLLER
MEDIA GATEWAY
GATEKEEPER
H.323 TERMINAL
22
1"
18
21
1'
2
20
19

FIG.3

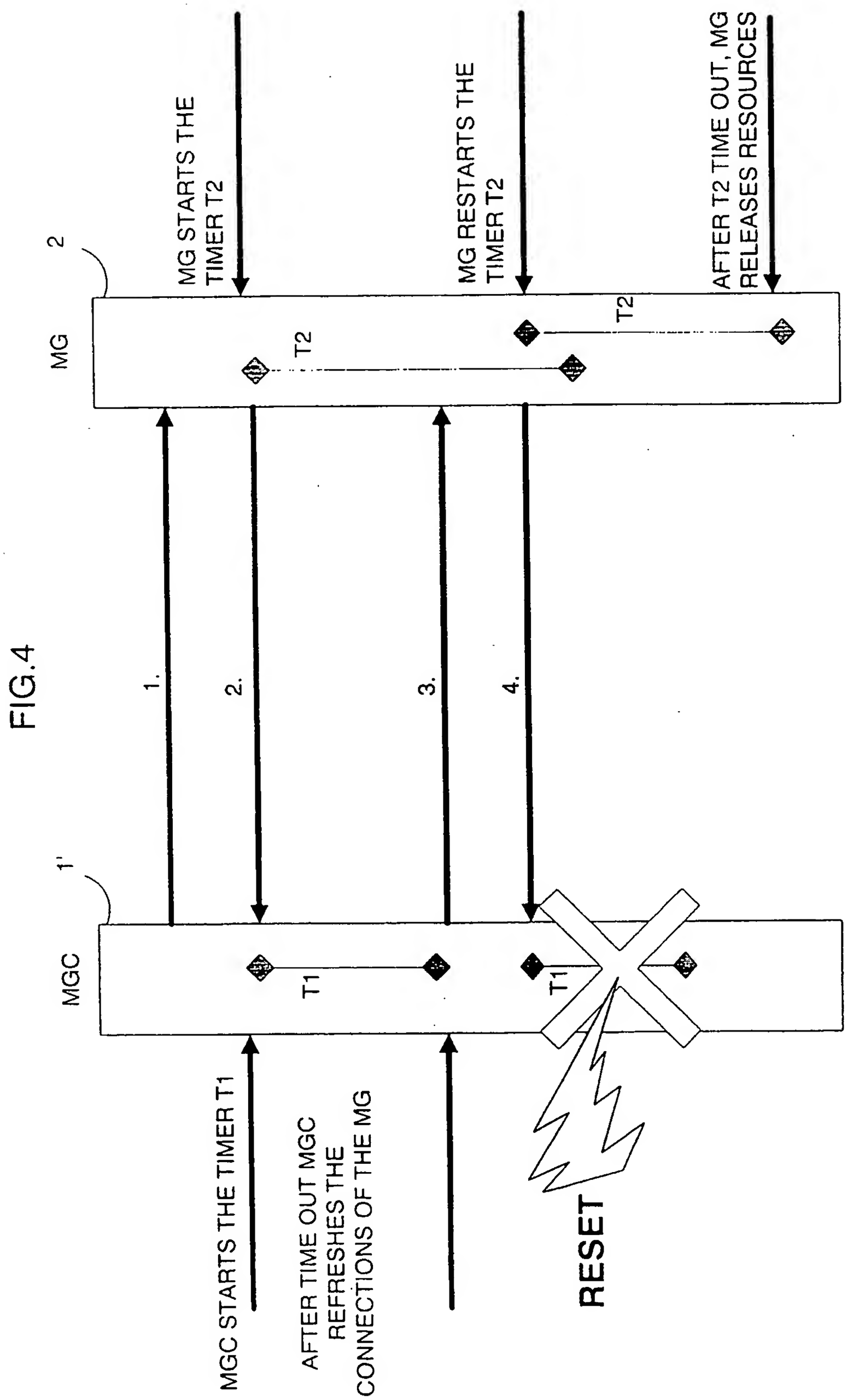

MG
2
MG STARTS THE TIMER T2
MG RESTARTS THE TIMER T2
AFTER T2 TIME OUT, MG RELEASES RESOURCES
T2
T2
1.
2.
3.
4.
MGC
1'
T1
T1
MGC STARTS THE TIMER T1
AFTER TIME OUT MGC REFRESHES THE CONNECTIONS OF THE MG
RESET

FIG.4

FIG.5

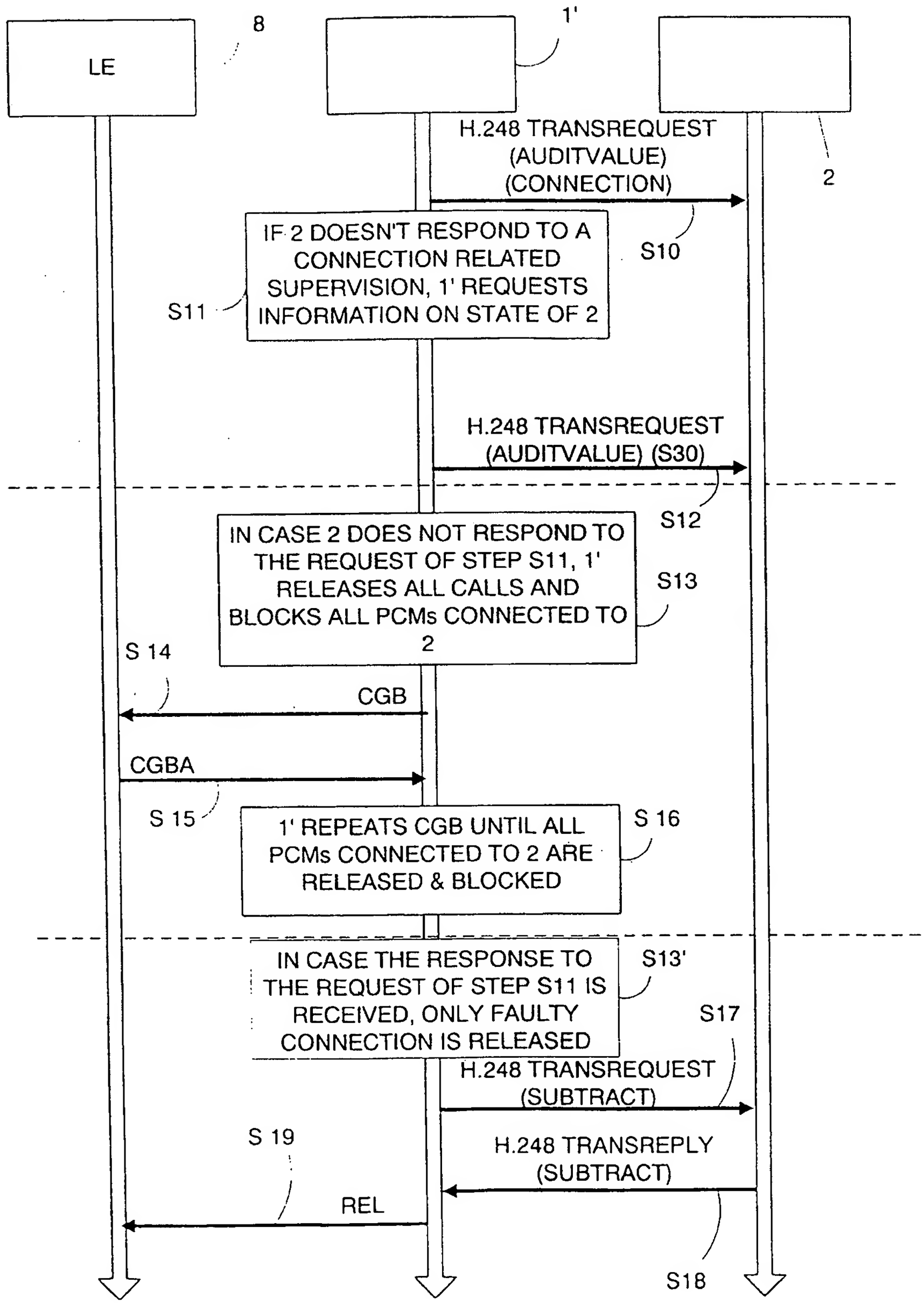
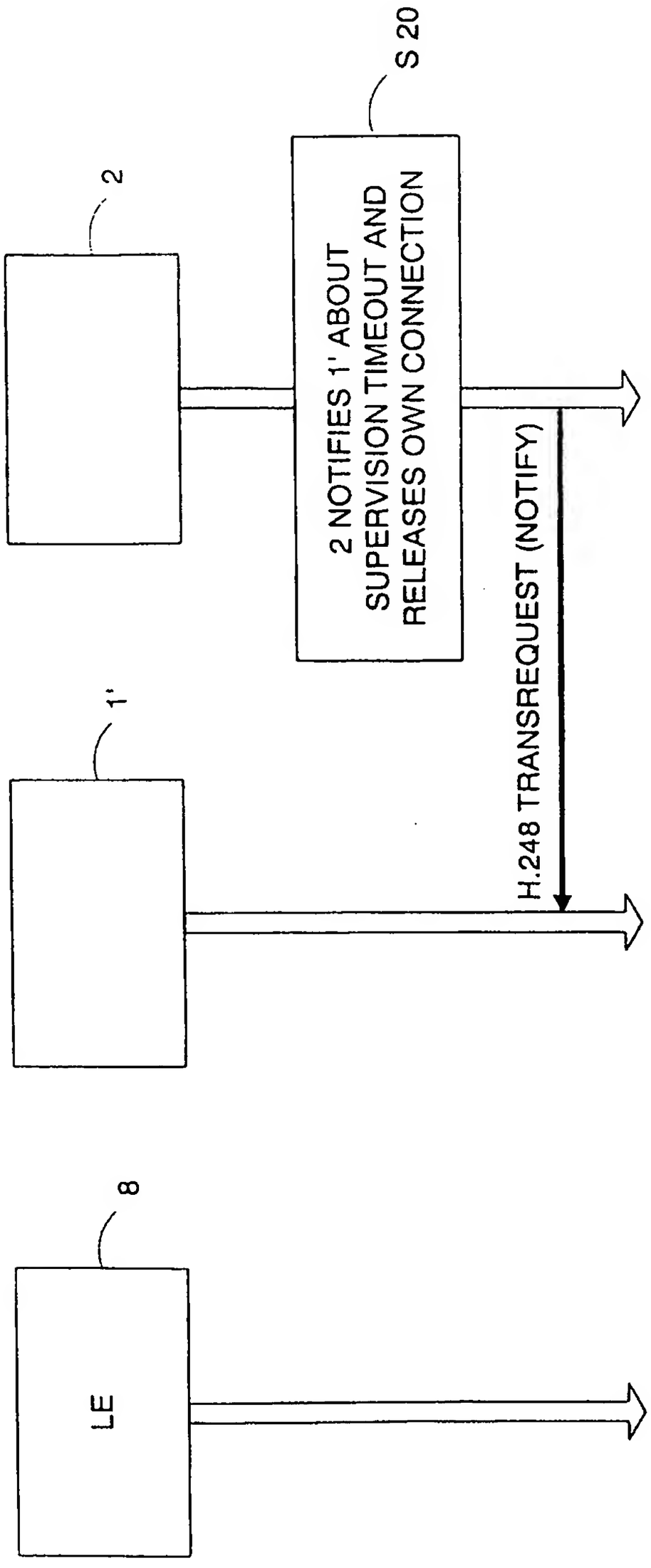

LE
8
1'
2
H.248 TRANSREQUEST
(AUDITVALUE)
(CONNECTION)
S10
IF 2 DOESN'T RESPOND TO A CONNECTION RELATED SUPERVISION, 1' REQUESTS INFORMATION ON STATE OF 2
S11
H.248 TRANSREQUEST
(AUDITVALUE) (S30)
S12
IN CASE 2 DOES NOT RESPOND TO THE REQUEST OF STEP S11, 1' RELEASES ALL CALLS AND BLOCKS ALL PCMs CONNECTED TO 2
S13
S 14
CGB
CGBA
S 15
1' REPEATS CGB UNTIL ALL PCMs CONNECTED TO 2 ARE RELEASED & BLOCKED
S 16
IN CASE THE RESPONSE TO THE REQUEST OF STEP S11 IS RECEIVED, ONLY FAULTY CONNECTION IS RELEASED
S13'
S17
H.248 TRANSREQUEST
(SUBTRACT)
S 19
H.248 TRANSREPLY
(SUBTRACT)
REL
S18

FIG.6


S 20
2
2 NOTIFIES 1' ABOUT SUPERVISION TIMEOUT AND RELEASES OWN CONNECTION
H.248 TRANSREQUEST (NOTIFY)
1'
LE

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/EP 00/03035

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/56 H04L12/66

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 740 075 A (GOODMAN WILLIAM D ET AL) 14 April 1998 (1998-04-14) column 7, line 31 -column 8, line 6; figure 1 column 34, line 19 - line 29 column 54, line 29 - line 52	1,7
A		2-5, 8-11,14

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 March 2001	21/03/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Brichau, G

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/EP 00/03035

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	ANQUETIL L -P ET AL: "MEDIA GATEWAY CONTROL PROTOCOL AND VOICE OVER IP GATEWAYS. MGCP AND VOIP GATEWAYS WILL OFFER SEAMLESS INTERWORKING OF NEW VOIP NETWORKS WITH TODAY'S TELEPHONE NETWORKS" ELECTRICAL COMMUNICATION,ALCATEL. BRUSSELS,BE, 1 April 1999 (1999-04-01), pages 151-157, XP000830045 ISSN: 0013-4252 page 152, left-hand column, line 33 -page 153, left-hand column, line 18 page 153, right-hand column, line 7 -page 154, left-hand column, line 45 -----	1,7

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/EP 00/03035

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5740075 A	14-04-1998	US 5682325 A	28-10-1997
		US 5621728 A	15-04-1997
		US 5748493 A	05-05-1998
		US 5917537 A	29-06-1999